REMARKS

Claim 10 was accidentally canceled in the Amendment filed on November 19, 2009.

Thus, claim 38 is added to recited the subject matter of original claim 10.

Further, claims 11-17, which depended from claim 10, either directly or indirectly, are canceled.

Claims 39-45 are added to recite the subject matter of original claims 11-17, respectively.

Upon entry of the Amendment, which is respectfully requested, claims 1-9 and 18-45 will be pending.

Review and reconsideration on the merits are requested.

Claims 1, 2, 4-10, 30-33 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over "Nishimura" (EP 1,191,131) in view of "Gernov" (U.S. Patent 6,194,099) and "Parmentier" (U.S. Patent 6,361,900), for reasons of record.

Regarding claim 1, the Examiner asserts that Nishimura discloses an electrode which comprises a carbonaceous material and carbon fibers having a diameter of 1mm or less. The Examiner concedes that Nishimura does not disclose the porosity of the electrode. However, the Examiner relies on Gernov as disclosing that it is known in the art that if one wants to achieve the highest possible volumetric density of the electroactive material and electrode, that it is desirable to maintain the porosity of airfolds as low as possible and that carbon nano fibers having a diameter of less than about 1000 nm should be used. See column 2, lines 60-67 and column 6, lines 20-29 of Gernov. The Examiner asserts that it would have been obvious to modify the electrode of Nishimura to have a low porosity as taught by Gernov (where porosity is said to be an art-recognized result-effective variable subject to routine optimization), since this is

said to produce the known result of achieving the highest possible volumetric density of the electroactive material in an electrode.

Further, the Examiner cites Parmentier as evidence that the specific porosity range of 25% or less is known in the art because Parmentier teaches a secondary cell electrode comprising a carbon fiber substrate with a porosity lying in the range of 10% to 30%. See column 1, lines 56-62 of Parmentier. Essentially, the Examiner relies upon Gernov as suggesting the specific porosity range of Parmentier to modify the electrode of Nishimura.

Regarding the remaining rejected claims, the Examiner cites Nishimura as disclosing that the carbon fibers are heated to 2,000°C or higher, that the graphite carbon fiber contains boron in the amount of 0.1-3 mass %, which the Examiner asserts is equivalent to 1,000 - 30,000 ppm, that the amount of carbon fiber is 20 mass % or less, that the carbon fibers have an aspect ratio of 10 or more, and preferably 50 or more, that the distance d_{002} between carbon layers is in a range of 0.335 to 0.342 nm, an electrode which comprises a carbonaceous material carbon fibers that having a hollow structure and branched carbon fibers, a carbon fiber having a diameter of 1 mm or less in an amount 20 mass % or less. Further, the Examiner asserts that the properties of claims 30 and 31 would be inherent to the electrode of Nishimura having a low porosity as taught by Gernov, and that Nishimura discloses an invention that relates to electrodes for batteries including a lithium ion secondary battery.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nishimura, Gernov and Parmentier as applied to claims 1, 2, 4-10, 30-33 above, and further in view of "Ouvry" (U.S. Patent 6,444,347), for reasons of record.

Claim 14 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nishimura, Gernov and Parmentier as applied to claims 1, 2, 4-10, 30-33 above, and further in view of "Qu" (U.S. Patent Application Publication 2003/0049531) and "Ishikawa" (U.S. Patent Application Publication 2003/0118908), for reasons of record.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nishimura, Gernov, Parmentier, Qu, and Ishikawa, as applied to claim 14 above and further in view of "Yamada" (U.S. Patent 6,040,092), for reasons of record.

Claim 34 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nishimura, Gernov, and Parmentier as applied to claims 1, 2, 4-10, and 30-33 above, and further in view of "Takahashi" (U.S. Patent Application Publication 2003/0124424), for reasons of record.

Applicants respectfully traverse.

In the Response to Arguments section (first sentence on page 13), the Examiner acknowledges Applicants' position that (b) Parmentier teaches the porosity of the carbon fibers, not that of the electrode. However, the Examiner disagrees citing col. 1, lines 56-62 of Parmentier, without further comment.

Applicants respectfully submit that the interpretation being taken of this passage is incorrect. Specifically, Parmentier teaches:

> "[An] electrode comprising a carbon fiber substrate in which the carbon of the fibers has a mean lattice surface spacing (d_{002}) of not less than 0.36 nanometers (nm), and a crystallite size such that the mean height (L_c) lies in the range 0.7 nm to 3 nm and the mean width (L_a) lies in the range 2 nm to 6 nm, and presents total porosity lying in the range 10% to 30%." Col. 1, lines 56-62 of Parmentier (emphasis added).

The Office Action seems to interpret the phrase "and presents total porosity lying in the range 10% to 30%" as modifying the noun "electrode."

However, this interpretation is in error, because it is in conflict with the rest of the specification. Instead, the phrase "and presents total porosity lying in the range 10% to 30%" modifies the phrase "carbon of the fibers," rather than the electrode itself. That is, the phrase should be correctly interpreted as meaning that the electrode of Parmentier comprises a carbon fiber substrate, and that the carbon fiber substrate contains carbon fibers having a "total porosity lying in the range 10% to 30%." This interpretation is correct because the rest of the specification clarifies that it is the carbon fibers which have a porosity of 10% to 30%.

For example, Parmentier unambiguously states that "the total porosity of the carbon fibers lies in the range 10% to 30%." See col. 2, lines 44-46 of Parmentier. See also, col. 2, lines 4-5 and col. 4, lines 7-9 as well as claims 1, 3, 6 and 14 of Parmentier. In particular, claim 1 of Parmentier contains *nearly the exact same language* as cited by the Examiner, but dependent claims 3 and 6 clarify that the total porosity relates to the carbon fibers.

Therefore, Parmentier neither discloses nor suggests an electrode having a porosity lying in the range of 10% to 30%.

Further, even if Parmentier does teach a porosity lying in the range of 10% to 30%, which it does not, Gernov does not provide a motivation for reaching a porosity of the electrode of 25% or less.

In the Response to Arguments section, the Examiner acknowledges Applicants' position that (c) Gernov discloses the porosity range of 40 to 60% and does not teach 25% or less. However, it is asserted that Parmentier is only cited to show that the range of 25% or less was known. Gernov is relied upon for providing motivation to reduce the porosity to as "as low as possible."

Applicants respectfully disagree. Gernov mentions that the porosity or air voids in the cathode coating layer should be maintained as low as possible, but then Gernov specifies that the range contemplated is 40 to 60%. Thus, Gernov's statement concerning "as low as possible" is correctly interpreted to mean around 40%, not 25%. Further, Gernov teaches improving low electrical conductivity and poor low porosity of electroactive sulfur materials and providing increased mechanical strength to maintain a highly porous structure by use of non-activated carbon nanofibers (see from column 10, line 66 to column 11, line 20), and does not suggest a porosity as low as 25%. Accordingly, Gernov does not provide a teaching or motivation to modify Parmentier.

Furthermore, Applicants respectfully submit that there is no teaching, suggestion, motivation, or other reason to combine Gernov, Parmentier and Nishimura, because the objectives of the invention of Gernov, Parmentier and Nishimura differ from each other. Specifically, Gernov aims to improve the electrical conductivity of electroactive sulfur materials (col. 5, line 65 through col. 6, line 9); Parmentier aims to improve moldability of the carbon fiber sheet, prevent the peel-off of the sheet and enable lithium ion insertion and de-insertion (col. 1, lines 39-53); and Nishimura aims to improve the crystallinity degree of the carbon fiber itself (page 3, lines 28-43).

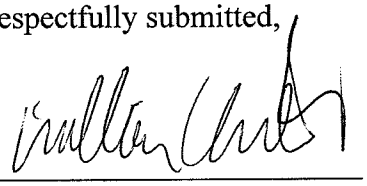
Thus, all the cited references have different objectives from each other, such that there is little or no motivation for a person of ordinary skill in the art to combine teachings of Gernov, Parmentier and Nishimura.

Therefore, Applicants respectfully submit that present claim 1 and claims dependent thereon are non-obvious. Reconsideration and withdrawal of the § 103 obviousness rejections are respectfully requested.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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